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ASNE
3 March 2016

Adm. Richardson: Thank you very much, Captain White. It's great to be here this morning

Yesterday was the action packed, filled, substance day. This morning I am just the eye candy. Okay? [Laughter]. This is all going to be fluff. As Secretary Stackley got here and he was, you know, he gave, as he always does, what a terrific guy, just right to the substance. I'm all about form.

How many people in here fancy themselves to be a no-kidding engineer? Raise your hand. Okay. I would actually expect to see more hands go up at this conference. Anyway, I guess everybody else is just kind of, wants to be around engineering which is a great thing too.

It was interesting, how many people in here would fancy themselves to be a young engineer? [Laughter]. All right. There you go. Thank you, sir.

It's interesting as I was walking around, particularly naval reactors. We've visited a lot of shipyards, a lot of places where they did a lot of engineering, labs, et cetera.

Any NR folks in here? I don't think they're allowed to come. [Laughter].

And you would find these young engineers, and there was this constant tension or kind of a constant theme that we need to get these young engineers out to the job site, basically, right? So they can get down there, they can get engaged, get their hands dirty and start learning about what they are actually doing, rather than just kind of doing the engineering paperwork.

I always thought when I was interviewing candidates, you know, the folks, I would ask them kind of what they do, what they're up to, what do they like to do? And the people that rebuilt their cars and the people that built hardware, you know, put together computers and robots and all that stuff I thought had a terrific leg up on folks that just had sort of this academic approach to engineering. It's always been to me kind of a let's get our sleeves rolled up. So that's exactly what I'm going to do, and I'd encourage you all to join me.

If you're an engineer, let's just take a moment. I'm going to take my jacket off and I'm going to roll my sleeves up and then we're going to get going here. So any true engineer, jackets off, sleeves up. [Laughter].

If you've got your jacket on still, please leave. [Laughter].

Here we go.

Many of you may be aware that I recently rolled out, and I was just the one to roll it out. This is the Navy's design for maintaining maritime superiority, and we've had a lot of buy-in and a lot of excitement as we've rolled it out. I just wanted to walk you through it and give you some of the logic. There will be an engineering theme. We'll take a detour, if you will, and sort of dwell on some of the engineering aspects of this. Let me see if I can get going here. Okay, that works.

What the design talks through is a how we're going to win the contest for maritime superiority. And the key to this phrase right now is contest. And so this is something I think is pervasive through every part of the Navy and particularly here in engineering. For the first time in 25 years there is a contest. The game is on. The game is afoot. And the margins for winning this contest for reasons that we'll highlight later are absolutely razor thin. If we are not grasping for every inch all the time, we're going to fall behind. We're going to certainly fall behind our potential, and worse than that, we could fall behind our competitors. So this idea of a contest, this sense of urgency is what I want to instill in you this morning.

Normally when you talk about a contest it's easy to talk about the teams that are involved, right? And we do that all the time. I'll take questions and we'll discuss a little bit about that but more than the teams right now, I think we need to stop and consider the change in the character of the game. The rule set and the pace particularly have changed fundamentally so that not only are we dealing with new teams, but we're dealing with these teams that are operating at a game that is fundamentally different than the one that maybe some of us who are not young engineers grew up with. That's what I want to talk about this morning.

A little bit of a busy slide, and I don't know if we can turn the lights down. But I'm going to talk about sort of three forces that are acting in our environment right now that shape this game. One is the maritime system. If you look at that, we've highlighted on the slide the trade routes, right? The sea lanes. And if you look at that, much of that has not changed since, you know, man first put to sea thousands of years ago, maybe the Suez Canal and the Panama Canal, but the choke points are pretty classic and even though if you look on a political map or a map, you know, the whole ocean looks blue. It looks pretty uniform. In fact it's not uniform, right? There's structure to that. And that structure, those nodes, those choke points, those sea lanes give rise to opportunities and vulnerabilities, all of which can be exploited.

So they're saying hey, what's changed about that? That looks pretty much like a map I could have drawn 50 years ago easily.

Well I'll tell you, since the Wall went down, let's say 1990, okay? Just as a rough date. The traffic on the maritime system has increased by a factor of four. So even though this system has been in place, it's accelerating tremendously right now. This four-fold increase is driving and fueling the growth in global domestic product and is out-pacing it. So GDP went up by about 80 percent in the same period of time; maritime traffic by a factor of four. All right? So increasingly used maritime system.

And it's not just the traffic over the oceans, it is also that which lies on the ocean floor. And for a number of reasons. The Arctic ice receding is making continental shelves accessible that were not accessible before. And technology is making vast parts of the ocean floor accessible that were also unreachable not too long ago. So you see here, let me see if I can get the laser to work. All these little green dots are indicative of mineral deposits that are all accessible now.

The amount of exploration and the amount of natural gas and oil that is going to be taken from the ocean floor is expected to grow by 50 percent in the next 15 years. The sea lane over the top of Europe here in that same amount of time, that's going to be open for transit about twice as much as it is today, right? Because of this receding ice. So there's a great deal of change that's going on in what one could consider a classic maritime system. Even there, things are accelerating.

Part of that infrastructure that lies on the ocean are those sea cables, those trans-oceanic cables and there's been a lot of talk about those lately. The internet traffic that travels from the United States to Europe and overseas, 99 percent of that traffic goes over these cables. So the trans-oceanic information rides on these cables, almost all of it. And that traffic can't be reconstituted. So this is also a nice segue to the next system.

So this idea of the maritime system is changing in fundamental ways very quickly right now. The last 25 years the character has changed. These cables allow me to segue to the next system which is the information system, another global system that has changed the way we do everything and that includes the business that we do at sea.

Just because it's engineers I'm going to show you how I've lost all of my engineering and throw some numbers out here.

The cost of entry into the engineering, this information system is just astonishingly low right now, right? Almost anybody with a laptop is a full-on player, and in this system things are changing super rapidly. So when Tom Eckles and I were department heads it was one gigabyte of memory, which was all you could get at that time, was about $625 per gigabyte. And today that gigabyte costs about a nickel, and you know, who's got the gigabyte hard drive out there? Yeah, nobody. We're looking at terabytes at the minimum.

It was interesting, when I was at Devron, I'm sorry, I'm kind of, I got a splinter from the podium here. [Laughter]. I'm a little distracted as I bleed all over my speech up here.

When I was at the Submarine Development Squadron 12 we gave this conference, hosted a conference of kind of human/machine interface and we were talking about this thing, and I walked in, and it was kind of a technical conference. You know, cutting edge, we were hoping. And when I walked in, first, I was the youngest guy in the room so I was in trouble right away; and we talked about this idea, and it was the Submarine Development Squadron and we talked about this idea that hey, let's just, you know, store everything that we sense from the submarine. All the submarine sensors, the acoustic sensors, et cetera. And you know, on the back watch, on the mid watch or something when things aren't particularly active we could go through that data and just, you know, run filtering on it. Do detection and estimation on this data and see what we find. Maybe we find some deeper signals that you don't do with some of the more tactical types of estimation work that you do. Somebody raised their hand and said Admiral, or Commodore. That's nuts. You know, that’s going to take like a terabyte to store all that. And he’s armed with just a PC Magazine that was already selling terabyte hard drives in the back.

So in terms of thinking ahead in this world, it’s getting harder and harder. The smart phones that we carry around in our pockets right now are orders of magnitude more computing power than we used to land on the moon.

Ninety percent of the data that exists in the world right now was created in the last two years. To give you a sense of kind of the exponential pace at which things are moving. And the links here continue to multiply.

The first server that comes on line, and it came on line in ’93, last year 2.7 million servers shipped around the world. So you can sense, if you’re not kind of feeling yourself set back in your chair by the acceleration, then we need to go get you another cup of coffee.

Then there’s, let me just see if I can go back.

Again, you know, you log onto your computer and the entire internet I available to you. It seems, just like that map of the ocean it seems it’s all blue, it’s all accessible, it’s all there for you. But in fact even in the information system there are nodes, there are channels, there are pathways that can be exploited, right? Those are opportunities and vulnerabilities.

Similarly here. Right? A big part of the information system rides on satellites. This is a picture of kind of the satellite density around the earth and you can see their structure. Some orbits are better than others. So all of that can be exploited as well.

So we’ve talked about two forces. Forces that are driving acceleration in the maritime domain, forces in the information domain. These global systems. Of course they’re going to be under increasing stress as the world becomes more globalized.

The third system, the third force talks about the rate of technology introduction. I know I’m preaching to the converted here, but it’s coming at us at an astonishing rate. It’s not just Moore’s Law stuff.

Here is a curve that describes the introduction of patents. The number of U.S. patents. And you can see kind of that exponential shape there towards the end. We'll pan through a couple of others. Basically the capacity of manufacturing. Okay? And a third one will come as no surprise. This is the number of internet hosts. So all of these technologies coming at us very very quickly and picking up speed. And it's not just information technologies. These things enable genetic technologies, 3D manufacturing, artificial intelligence. You know, some real fundamental game-changers that again we've got to think ahead on or we're just going to be left wondering what is going on.

And it's not just the fact that it's being introduced and invented. It's becoming adopted by people at a faster rate as well.

If you go back to when Alexander Graham Bell invented the telephone, it took 35 years for 25 percent of Americans to adopt and get a telephone. Okay? And you can see just from this chart, things have picked up. It took about seven years for 25 percent of America to get on the internet. And it took, when the smart phone came out, within four years 25 percent of Americans had a smart phone. So this technology is coming at us faster and faster and is being adopted by society, being used faster and faster as well.

So look forward just a little bit. Here's that Google Car. It's become an iconic example almost. What is an icon today? Most of the music I listen to is classic rock now, so I don't know what this means. But this Google Car. In 2004 when DARPA issued a grand challenge, not a single robotic car was offered, 2004. They thought it couldn't be done. Here we are now, this car has driven probably over 1.5 million miles right now. It's had remarkably few accidents, and those accidents were caused by people running into the Google Car. Right? And the cameras from this Google Car have just revealed remarkable things about driving. Right?

There was one video clip that showed somebody practicing their trumpet while driving. So you wonder.

I'm a cyclist, and people working on those machines, texting and everything else, I don't ride on the road anymore. It's just become too dangerous. Right? I'd much rather be riding on a highway full of Google Cars. It would be a much safer thing than it is with people practicing their trumpet and shaving and texting. But something that wasn't even conceivable in 2004, now 1.5 million miles under its belt.

So this idea, the character of the game I think is an important thing for us to assimilate, in this room in particular. Because you are the ones that are driving a lot of that change. I hope you're driving it. I hope we're driving it and not lagging it.

During the question period I'm sure I'll take a few about the bureaucratic overhead that's required to get through for you to do your job.

I should have told you at the start, too, I've got about an hour and a half of material and then we'll break for questions, so hang with me. I'll try and pick it up.

I talked about the character of the game and I told you I'd talk about teams and this is just to set the context. This is a competition and there are more players in it than just us. In one group I'd say you've got the global powers. We have returned to great power competition and these are our competitors in great power, in the great power category, if you will. And we can talk about what defines a great power, but I think most of us would agree that the United States and these two countries would be in there.

Another group of threats would be this group. You're tempted to call them regional rather than great powers, but nothing is regional anymore. By virtue of some of those technologies virtually everything is trans-regional if not global. So you can't call them regional anymore, but they're certainly not great. Very very challenging.

Then there is this pervasive global counter-terrorism fight that has proven to be very resilient, very adaptive and very persistent, and continues to challenge us today.

New actors. If I gave this talk five years ago some of these folks would not have been on there -- Russia and ISIL would not have been in the list of competitors, and many lists. So the team have changed as well.

Overall, things getting faster, more challenging, and you all know that our resource situation is relatively flat, so there's this widening gap that we have to address.

So let's bring it all together. We've got the character of the game, information technology and technologies in the maritime system enabled by information and you've got these actors, these competitors, and let's see if we can sort of get a picture of how this all might come together.

So let's go back to the classic maritime, sea lanes, choke points and stuff. And I will put what I would call a classic, like classic rock, coastal defense cruise missile radius. So each one of these little yellow circles is kind of a classic cruise missile radius. If you're going to defend that choke point with a missile battery, that might be you know, the area of influence that you would have.

Let's forward now to today's technology where all of this is able, has enabled us to target and hit targets with great precision at great range and that circles look more like that. And when you look at that, you start to understand why words like anti-access come about. I'm not a huge fan of that term, but I can certainly understand why someone would think that if you can take a look at that slide. The entire South China Sea, the Mediterranean. About 25 percent of so of the world's trade goes through the Mediterranean; 30 percent through the South China Sea. So you can start to see why people are concerned.

So how are we going to fight this? How are we going to keep up?

I'm a big fan that even in this context if you want to get a new idea, read an old book. So I'm just kind of going to go back to my naval reactors library and talk about an extremely optimistic and fast-moving time in our not so distant past. We'll talk about atomic power, nuclear power.

Fission discovered in 1938, this conceptual idea. And here is the atomic pile underneath the stadium in Chicago that Fermi used in 1942 to actually do the first controlled fission. Brought that pile critical. I think that guy is the axe man. He's looking pretty happy.

Okay, fast forward not too much from there. So think about this date, 1942. The first experimental achievement of criticality. Okay? And in 1955, 13 years later, we had taken that, we have moved forward from that atomic pile in Chicago and harnessed that into a propulsion plant, had put that into a submarine, and had launched a submarine that broke every submarine record on the books. Thirteen years. Okay? Amazing.

And it didn't stop there. In the mean time in 1955 we were already building the next generation of nuclear powered warships. Enterprise was already on the books and started, and the next generation of submarines, including ballistic missile submarines. And again, an amazingly optimistic approach.

When we decided that we could saw an attack submarine in half and put this missile compartment in the middle, we didn't have the missile built, we didn't have the warfare system built, we didn't have the warhead or any of that built but we said you know what? We can do this. And there were a couple of real visionary people -- Rayburn, Rickover, Arleigh Burke, who said you know what? We're just going to make this happen. This was kind of the Navy version of within this decade we will land on the moon. Okay? And it drove so much. But it was not only nuclear power and propulsion and missile systems, but because that technology drove us undersea, you know, you had disciplines like oceanography, underwater acoustics, navigation, inertial navigation, missile systems, rocket technology. All of these things flourished by virtue of this revolution. Okay?

So you got to see this revolution in a very short period of time, from 1940s, 1942, 18 years later you were launching Polaris.

Think about that in the context of today's acquisition systems. Okay? Maybe we can get the paperwork together in 18 years.

There are other terrific examples. The F-117. Al right? Five years from contact to delivery. That's pretty remarkable. Five years. 1978 was the contract and this thing delivered in 1983. Okay? The first test flight was even sooner than that, 1981. So it can be done. We can do this.

It can also be done wrong. We have to be cautious of this. This is one of my favorite examples. If you've heard me talk a couple of times, this is the BOLO, I think it's the B-18, BOLO. Okay? Anybody heard of the B-18 before? Some folks. It was an aircraft. Douglas produced it, and it was adapted from the DC-2 and designed in 1934, right when we were in the Depression, we were looking, competing against other designs like we do now, and it won the design. What do you think was the driving factor? Cost, exactly. That was kind of half of the competition was weighted towards cost. Went into production, went to operational units, and when Pearl Harbor happened, December 7, 1941, it was the most numerous bomber in the inventory. Okay? Then the war broke out and it's time to get this thing and employ it, and they found at that point it had a few shortcomings. Just a couple. It had small range. It had slow speed. It had a wimpy payload. It had no defensive armor.

And it has no offensive armament. Just a couple of shortcomings, right? [Laughter].

So what do we do? Well, we had to go back to the B-17, right? And we built a bunch of these.

Remember what they called this plane? Flying Fortress, right? What would you rather ride to war in? The Flying Fortress or the BOLO? [Laughter]. Right? Then of course we went forward with the B-24 and we got back on track.

So we can optimize to the wrong criteria if we're not careful. So when you think about some of these systems that we have in play right now, we've got to be careful that we build something that can be used and we don't build the next version of the BOLO, but we're just going to have to recall it.

We don't have the time to do that these days. Right? We just don't have the time to get it right. And it's easy to sort of look back and say those guys were real knuckleheads. They were pretty smart people. They were trying to do the best they could. They had a lot of the same dynamics going on that we have. Okay?

All right. Here's one, and I use this example with caution, and I would say that it's a mixed story. It is certainly one of the most highly awarded and remarkable programs, and I'm talking about Aegis. Wayne Meyer, the "Father of Aegis", shepherded this project through. 1985 won the ASNE Lifetime Achievement Award, I think for his work on Aegis. And Aegis, it was a game-changing system. Right? And I think Mr. Meyer's catch phrase was build a little, test a little, learn a lot. Okay? And that's awesome. I love that catch phrase. But it took 16 years to get this thing kind of up and running. So while there's a lot that was good about that system and it remains good, right? We still use this system and baseline nine of this system, and moving into even higher AMDR types of radars is remarkable. That is kind of the 5th generation of combat systems and radars.

We don't have 16 years these days to get this done. And so I hope we're feeling this sense of urgency come into the room.

All right, let's go forward here.

This is, I'm getting now to the lecturing part. I'm afraid I just can't help myself.

One aspect of the design for maintaining maritime superiority is this idea of high velocity learning. I would say that, if I have to do an honest self-assessment, this is the least understood of the four lines of effort, right? So we've got a line of effort that talks to maintaining the right people and nowhere, very very important for this team in engineering to recruit the right people. To recruit that high-level talent. And you know the competition for that talent is just intense right now. So how do we bring them into and onto our Navy teams?

There's a whole line of effort that talks to doing right by our people. And as you know, everything begins and ends with our people. So we've got to make sure we keep them front and center.

There's a lot of effort that talks to our partnerships, and one that I wanted to highlight in this group is, it's kind of a classic, when you say partnerships you think international partnerships, but there's also partnerships with academia; there's partnerships with industry; there's partnerships with other labs; and so I want to work together with ASNE and other groups to make sure that we're taking full advantage of all those partnerships, that we've lowered the obstacles to communicating and sharing information to the greatest extent possible; that we've enabled our labs to be as competitive places to work as anywhere else. So I need to hear from you about what are those obstacles? How can I help you bring those down? Right? So help me out there with the partnerships line of effort.

The third line of effort is operations and warfighting. We're back out into sea control types of missions, so we've got to sharpen our skills in high end competition and conflict at sea. Warfighting at sea. And with all of those technologies that we talked about at the beginning of the talk, how do we go and get about that? That's an entire line of effort.

Then there is this fourth line of effort where we talk about high velocity learning. And as we talk about it, I just get the sense that everybody's on board with it. We're not getting any denial. But I get this sense that there's a whole bunch of people out there kind of waiting for their high velocity learning kit to arrive at the mail room of their commands and it's like okay, I'll tear this thing open, it has a big smiley face on it or something, you know, and I'll get out that kit and then I'll start learning. Or the other model in people's heads

I sense is that hey, there are parts of our business that learn, and I guess this is over to them. Right? I'm not a learner. Okay?

So 85 percent of this high velocity learning must happen right in our shops, right in everything that we do. It is self-teaching, is really what it is. High velocity self-teaching. So I feel very comfortable stepping through the next few slides quickly because nobody should understand the scientific method better than this team. Okay?

So that's what we've got here. Kind of an operational version of the scientific method where we're going to do our very best. We'll start by defining the problem. What are we getting after? We're going to have to get after that problem in an environment and we're going to take some time to predict that environment. It's a very complicated environment, right? So at some point we've got to just put pencils down and say this is as good as we can get right now. It's all we're going to do. We're not an academic institution. We're an institution of action. So we'll do the best prediction that we can do and then we've got to formulate a plan. Okay?

The next part's the most important part, I think, is that when we formulate a plan we've got to predict a result. Right? What is our expected result? And all you scientists and engineers, you know, about this, right? You go and put together a test plan and you've got an expected result of that plan. Then you run it and you see what you get. Right?

Operationally, we need to improve here. In many many areas around our business we need to improve. In fact, I'd encourage you to apply this model in almost everything that you do. What is your expected result? Safety, for instance. Right? Top priority. I want to get more safe. I'm going to propose that I take a course, right? I'll execute some training. Okay, I got it. You know that time comes at a cost, right? When I'm sitting in that training, that means I'm not doing something else, so what am I going to get for that cost? What do you expect to see? Do you expect to see injuries reduced by what? Twenty-five percent? Thirty, forty? Give me your predicted result. Okay?

So don't move into execution until you've got all these pieces in place. And then, because we are not an academic institution we act. Right? That blue arrow. And we learn a ton. We operate in the actual environment, right? So we've done our best to predict the environment and now we're out there in the actual environment and we execute the plan that we have and we get an actual result. All right?

This is when the interesting part and the learning part starts. What's the next step? Compare, right?

What happened? What were the differences between my expected result and my actual result? And we do some gap analysis or causal analysis and we resolve that, right? Difference. That's learning. I expected a particular result, I got a different result, what happened? Why the difference?

So you can see now the importance of the predicted result before you start, because without that there's no basis for gap analysis. You just sort of have a result and you know, you don't know why, and it's hard to learn. Okay?

Then what do you do? We should all be singing this in unison, right? I mean it's like what do we do next? Well, we run it again. Right? And only now if you sort of think about increasing knowledge on the Y axis here over time, you know, we're smarter this time. We understand the environment better and we've made some adjustments to our model because we're out there in the actual environment. We've adjusted our plan, or maybe we've adjusted our goals because we've done that, the gap analysis between our predicted result and our actual result. So now we just run that entire cycle again. Okay?

This exponential curve, exponential-ish, is kind of describing, descriptive of the pace of technology, the potential of technology, right? Performance can now follow this exponential curve in so many areas of our world right now. And we've got about a ten-year time frame along the bottom axis. The entire slide describes ten years. And you can see that one acquisition or engineering model is hey, we defined some extremely far-reaching goals, long-term programs, and so we build and we define specs and all of that and we go and go and go, and sometimes ten years down the road we finally have some kind of a prototype or a demo and we run our first experiment and this is a description of kind of where that might be. You get one learning cycle in ten years. Okay?

The difference between where that might bring you and the potential curve is huge. Right? We've got to make sure that, well, that's just missing potential. That's loss potential. And this is the most benign representation of that because this is just us versus potential. It doesn't talk about our competitors and what they're doing and how they're exploiting these forces.

So I'd advocate for sort of a shorter learning cycle. An acquisition system that gets out there, experiments faster, learns faster, shorter learning cycles, so that we can adjust faster. This becomes much more habitual and we can hopefully ride that potential curve much closer and minimize the gap between where we are and our potential. And you know, if we're really good at it we can achieve right there. We can be right on it. Okay?

Do you think this is possible? We've got a lot of real smart people in the room. Is this theoretically possible? Of course it is. Right? But we've got to make sure our systems allow us to do that. We've got to drive to this short learning cycle.

It doesn't have to be just technology. This is a map of the Pacific in World War II, and this was the learning engine that we generated up in Newport, Rhode Island, to run through a series of war games to generate War Plan Orange. And we did that. We would go through and we would reach kind of an end. We couldn't go any further. We would fail. And so we'd go back and we'd adjust some things. We'd introduce some technologies, maybe. Right? We learned from this in terms of what technologies would make it better and then we went back. So our concepts matured by virtue of this learning cycle. So it's not all technology.

In fact when Admiral Nimitz went out to actually execute the war in the Pacific he said that when he did that, super complex environment, he was surprised by only one thing. Everything he saw he had seen in the war games except one thing. What was that one thing?

Voice: [Inaudible].

Adm. Richardson: Thank you. Historians, raise your hand. Nicely done. Okay. It's my plant back here. [Laughter].

So it doesn't have to be technology.

This is really, we're going to school now, so I'm going to draw a couple of axis. Performance over time. Here is our exponential curve. I would describe our performance kind of that way. We're improving but we're not improving exponentially. Okay?

Where do you think we are right now? If you had to strike a chalk line at 2016, where would that be? A little audience participation.

So the two lines cross. Would it be before or after the two lines have crossed? Who says before? Okay, optimists in the room, raise your hand. Who says it's after?

Okay, I think we all get the same sense. And so I would say right there. It's just at that point, the gap is I would say manageable if you look at it, take a snapshot without the derivatives, it's manageable. So we can kind of convince ourselves everything's okay, right now, but it's going to be unmanageable pretty quick. All right?

Oh, by the way, there's our competition. They're improving faster than we are right now. Okay? And just as this shows, we are probably just shy of those two lines crossing, but just shy. If we don't improve our pace, that crossing point is going to happen before we know it. What an interesting part of that graph we are living in right now. The challenge could not be more urgent, okay?

That's the potential. How do we achieve that potential? It's better than just the raw potential of the technologies, which is kind of on an exponential curve. But when you combine those technologies in new ways, you start to see elements of factorial types of curves come in, right? Factorial. Are you with me? It's early in the day, so I know I'm, and you know, a factorial curve over a few [inaudible] makes an exponential curve look like a flat line along the X axis. It's a very powerful curve.

So by combining these technologies in new and different ways we can achieve better than exponential performance.

A great example, back in World War II, the Home Defense System in Britain. Right? Pound for pound, kit for kit, the Germans had better radars than the Brits. But the British stitched them all together in a networked system and won the Battle of Britain. They combined those technologies in more creative ways. So it can be done.

Okay, so I'm right at a few minutes over my allotted time, but with your generosity I would like to get to some questions, so

I'll just go to my handlers over there. What do you think? Just give me the hook when it's time.

Admiral Eckles.

Audience: CNO, speaking now after the advantage of a couple of years in industry I've got a different and better appreciation for what the engine for innovation is. And frequently for those of us who need to not only do the right thing for the mission but also entertain a mission that says there's a business imperative too, we've got to find a balance in how we get our incentive aligned. One of those alignment incentive issues is on the very issue of competition. Not just for lowest price, but greatest bang for the buck. And so for us, it is often the case that our investment in pursuit of some greater good that follows requires us to achieve an edge over others in our own competitive environment by having an intellectual property that edges those guys. When aligned right, that also goes to meeting the Navy mission because of course it takes capability up that curve faster.

So the question I have is, how in an environment where we also for a lot of good reasons want to share our ideas, how do we avoid the dilution and the leveling of the playing field where incentives like competition over intellectual property needs to be preserved to keep that engine going? And I'd submit to you that there are times where a safe harbor for that kind of intellectual property protection in the name of advantage for not only the businesses that are innovating but for the government is way different from where we have it today. Today we say bring your good ideas, then we give it out to everybody who didn't invest, and then we are surprised by the outcome.

Adm. Richardson: I think that's an excellent point. As we strike to expand and strengthen these partnerships, particularly with industry, you know, I'm just working with every molecule to have those types of discussions at the strategic level, and we can find ways to get both done, right? This can be a win/win. And there's plenty to go around for everybody. Right? These private sector teams who answer to stockholders and boards and all those things, they've got responsibilities and they're going to be held accountable there.

We can do this, right? We've done it before and we can do it again. And certainly -- I used to when we'd walk around and talk, some of the work that we do obviously is highly classified and it's done by private companies. So they would say well, you know, if you want to raise the classification of that and the systems that would by extension need to be enhanced, you're going to have to pay for that. I was like well, you know, I bet you've got an intellectual property concern here as well, right? That's just as urgent as any security concern I would have. So I think there's a lot of overlap there. I think there's an awful lot of room for improvement and those are the types of strategic discussions I think we need to have to move this thing forward, but it's a great question.

Audience: Good morning, sir. Meghan Eckstein, with U.S. Naval Institute News. It's good to see you again.

You spoke about the learning cycle that you're pushing. Earlier this week you signed off on an LCS Review Team, and I was just wondering where that fits in with this learning cycle effort. And then also how the changing threat environment may affect how you choose to implement those lessons.

Adm. Richardson: Meghan, if I could just come across the room and give you a hug, right now, I would. It's such a great question. I did sign out with Secretary Stackley this review of the Littoral Combat Ship. I just thought, well one, it's a brand new class of ship. Right? We're just getting our legs underneath us, just getting water under the keel there, and learning so much. I thought it's the perfect time to sit down and get smart people and make sure that with everything that we've learned up to now, and with the challenges going forward, and the budgets have some things to say about that and we're going to come to kind of one model, we're going to converge on the frigate. It was time to see what we've learned now and not be, you know, committed to the original model, right? If we cement that in place, we basically embargo all of the lessons that we've learned and we don't incorporate them. So that's exactly the spirit of this review is how can we make this program more effective going forward, given what we've learned now and what we've projected in the near future? What does that mean for the manning, the maintenance, the mission modules, et cetera, for the Littoral Combat Ship? So that's exactly, this is high velocity learning in an LCS context. Thanks.

Audience: Admiral, Tim Oliver.

I'm with you, got the sleeves rolled up. Saw the kind of need to do this faster, experimentation. The cost issue is, again, I think the driver. I would just try to emphasize that we had early on an effort to have open architecture with defined interfaces as a driver to allow small black boxes to be tried out rapidly and still have that intellectual property protected. But I don't see all of the community having those kinds of requirements in their platforms, so I would just raise that issue.

Adm. Richardson: Let's talk about that because you raise an excellent point. So private industry folks, please raise your hand. Okay. Wow. Good.

Let's go back to that conversation that I think we should be having between the government and industry. I would say get engaged early and at a strategic level. And my sense is that if we describe, you know, hey, here's our best articulation of what we want to do, what we're after. And here's a couple of ideas in terms of requirements that outline a path forward. You know, a way that we might actually make this happen.

Then the next question I think is really key. What do you think? This is our goal. What do you think? How do you think we could best reach that goal? And I think a lot of you would come back and say your ideas are pretty good, but let me just tell you something, a couple of things you may not be aware of. And if you just thought about it this way we could bring these technologies to bear, combine them with this thing, and we could reach your goal so much more effectively and efficiently. Would you be willing to give that a try? Then write that into your requirements, you know?

I think those are extremely valuable types of conversations that really leverage all of the expertise and talent that's available to us. So those dialogues are absolutely critical and we must find a way to have those types of conversations.

I think I've got one more.

Audience: Doug Post from the Army.

I was wondering how, your talk consisted of two big pieces, one about exponential growth and IT and one about the requirement for exponential improvement in acquisition. How can you marry those? How can you use the exponential growth in IT power to produce an exponential growth in acquisition capability?

Adm. Richardson: I think first of all I would say that if I could just adjust your articulation of my thesis, it's exponential growth not only in IT but almost everywhere, right?

It’s easy for us to think of IT because Moore’s Law kind of defined it to be exponential, and that’s kind of Moore’s Edict, right? That’s what he’s said, we’re going to double every 18 months and that’s the way we’re going to stay competitive. So far it’s worked out.

There’s been some recent articles that we might be at the end of Moore’s Law. I’m sure you’ve read them. We’ll see.

But to your point, we’re trying to do this in our headquarters staffs, for instance, right? I would argue that we’re locked into models that have not really leveraged some of these information technologies to the best effect. At the very macro scale I think that what you’re saying is we could get technology to do the job that a lot of people would do, and would do it faster, allow us to be more agile in acquisition as well with fewer people, right? We’ve got machines that used to do things that people used to do in terms of decisions, I guess, and we may be not leveraging that advantage.

So I agree with you a hundred percent. In fact I think that going forward is one of the questions that I’ve got. You saw that Google Car, right? It’s not that much longer we’re going to have Google Truck and Google Train and that sort of thing, and it may not be Google, it will just be driverless vehicles. So what do we do with all the drivers? Right?

If we’re not thinking through those types of questions we’re just going to have a lot of drivers that are going to not have jobs. And substitute sailor for driver and you’ve got my challenge. So I need your help there.

Okay? Thanks very much.

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